

### **REMARKS**

This responds to the Office Action mailed on January 11, 2005.

Claims 1, 8, 9, 13, 14, 20, 21, 27-34, 37, and 38 are amended, no claims are canceled, and no claims are added; as a result, claims 1-38 are now pending in this application. The amendments to the claims are fully supported by the specification as originally filed. No new matter is introduced. Applicant respectfully requests reconsideration of the above-identified application in view of the amendments above and the remarks that follow.

Support for claims 1, 8, 9, 13, 14, 20, 21, 27-34, 37, and 38 can be found, for example, in the material incorporated by reference in its entirety from co-pending application 09/144,202, now issued U.S. Patent 6,320,222. Supporting examples from the incorporated material can be found in the figures and in the amendments to the specification filed in the response, mailed 27 May 2003, to the Office Action mailed 25 February 2003.

#### **§112 Rejection of the Claims**

Claim 37 was rejected under 35 USC § 112, second paragraph, as being indefinite. Applicant traverses these grounds of rejection of this claim.

Claim 37 is amended to expedite prosecution of the instant application. Applicant submits that claim 37 satisfies 35 USC § 112, second paragraph. Applicant respectfully requests withdrawal of this rejection of claim 37, and reconsideration and allowance of this claim.

#### **First §103 Rejection of the Claims**

Claims 1-26, 37, and 38 were rejected under 35 USC § 103(a) as being unpatentable over Mazure et al. (U.S. Patent No. 5,308,782) taken with Mukai (U.S. Patent No. 5,804,848) and Colinge (Article of "Reduction of Kink Effect...."). Applicant traverses these grounds of rejection of the claims for at least the reasons made of record.

Applicant reserves the right to swear behind Mukai at a later date.

Applicant cannot find a teaching or a suggestion of a method in the combination of Mazure et al. (hereafter Mazure), Mukai, and Colinge as proposed in the Office Action that includes forming a first source/drain region on a substrate, vertically forming a body region on the first source/drain region as a fully depleted structure, forming a second source/drain region

on the body region to form a column on the substrate, and forming a first gate on a first one of the opposing sidewall surfaces of the body region after forming the column, as recited in claim 1. In the Office Action, Mazure is cited with respect to forming a transistor, Mukai is cited with respect to having independently operated gate electrodes, and Colinge is cited with respect to a doping concentration and a thickness. Reviewing the Mazure Figures 1-4 referenced in the Office Action, Mazure appears to first form a gate and a gate oxide and then fill a void between gate oxide material with material for a source, drain, and body region, which is clearly a method that is in distinct contrast to the method recited in the instant claim 1. Further, combining Mukai and Colinge as proposed in the Office Action does not cure the deficiencies in citing Mazure with respect to claim 1.

In addition, Applicant cannot find in the combination of Mazure, Mukai, and Colinge a teaching or suggestion of a method including forming a body region as a fully depleted structure having a width and a doping concentration such that a threshold voltage is substantially independent of bulk charge in the body region in transistor operation, as recited in claim 1. The Office Action rejection appears to be based on the Office Action proposition that it is inherent that a fully depleted body region has a doping concentration and width such that a bulk charge (QB) has negligible effect in transistor operation. Applicant respectfully disagrees since the Office Action has not established a *prima facie* case of inherency. “In relying upon the theory of inherency, the examiner must provide basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic necessarily flows from the teachings of the applied prior art,” citing *Ex parte Levy*, 17 USPQ2d 1461, 1464 (Bd. Pat. App. & Inter. 1990) (emphasis in original). MPEP § 2112. Further, Applicant has noted in a previous response to an Office Action that the Office Action has not established a *prima facie* case of inherency. Since the Examiner has not subsequently provided a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic necessarily flows from the teachings of the applied prior art, Applicant respectfully requests that the finality of the current Office Action be removed.

For at least the reasons discussed above, Applicant submits that Mazure taken with Mukai and Colinge as proposed in the Office Action does not teach or suggest all the elements of the method as recited in claim 1. Thus, Applicant submits that claim 1 is patentable over Mazure

taken with Mukai and Colinge. For at least reasons similar to those stated above with respect to claim 1, Applicant submits that independent claims 8, 9, 13, and 21 are patentable over Mazure taken with Mukai and Colinge. The claims dependent on claims 1, 8, 9, 13, and 21 are patentable over Mazure taken with Mukai and Colinge for at least the reasons stated above with respect to claim 1.

Applicant cannot find a teaching or a suggestion of a method in the combination of Mazure, Mukai, and Colinge as proposed in the Office Action that includes forming an isolated vertical device region extending outwardly from the substrate where the isolated vertical device region is formed as a region of semiconductor material, forming a body region in the vertical device region, forming a first source/drain region adjacent to the body region, and forming a second source/drain region adjacent to the body region, as recited in claim 14. As noted above with respect to claim 1, Mazure appears to first form a gate and a gate oxide and then fill a void between the gate oxide material with material for a source, drain, and body region, which is clearly a method that is in distinct contrast to the method recited in the instant claim 14. Further, combining Mukai and Colinge as proposed in the Office Action does not cure the deficiencies in citing Mazure with respect to claim 14.

Thus, for at least the reasons discussed above, Applicant submits that Mazure taken with Mukai and Colinge as proposed in the Office Action does not teach or suggest all the elements of the method as recited in claim 14. Thus, Applicant submits that claim 14 is patentable over Mazure taken with Mukai and Colinge. For at least reasons similar to those stated above with respect to claim 14, Applicant submits that independent claim 20 is patentable over Mazure taken with Mukai and Colinge. The claims dependent on claims 14 and 20 are patentable over Mazure taken with Mukai and Colinge for at least the reasons stated above with respect to claim 14.

Applicant respectfully requests withdrawal of these rejections of claims 1-26 and 37-38, and reconsideration and allowance of these claims.

### **Second §103 Rejection of the Claims**

Claims 1-30, 37, and 38 were rejected under 35 USC § 103(a) as being unpatentable over Bertin et al. (U.S. Patent No. 6,060,746) taken with Mukai. Applicant traverses these grounds of

rejection of the claims for at least the reasons made of record.

Applicant reserves the right to swear behind Bertin et al. (hereafter Bertin) at a later date.

Applicant cannot find a teaching or a suggestion of a method in the combination of Bertin and Mukai as proposed in the Office Action that includes forming a first source/drain region on a substrate, vertically forming a body region on the first source/drain region as a fully depleted structure, forming a second source/drain region on the body region to form a column on the substrate, and forming a first gate on a first one of the opposing sidewall surfaces of the body region after forming the column, as recited in claim 1. In the Office Action, Bertin is cited with respect to forming a transistor and Mukai is cited with respect to having independently operated gate electrodes. Reviewing the Bertin Figures 3A-6, Bertin appears to first form a gate and a gate oxide and then fill a void between the gate oxide material with material for a source, drain, and body region, which is clearly a method that is in distinct contrast to the method recited in the instant claim 1. Further, combining Mukai as proposed in the Office Action does not cure the deficiencies in citing Bertin with respect to claim 1.

In addition, Applicant cannot find in the combination of Bertin and Mukai a teaching or suggestion of a method including forming a body region as a fully depleted structure having a width and a doping concentration such that a threshold voltage is substantially independent of bulk charge in the body region in transistor operation, as recited in claim 1. The Office Action rejection appears to be based on the Office Action proposition that it is inherent that a fully depleted body region has a doping concentration and width such that a bulk charge (QB) has negligible effect in transistor operation. Applicant respectfully disagrees since the Office Action has not established a *prima facie* case of inherency. “In relying upon the theory of inherency, the examiner must provide basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic necessarily flows from the teachings of the applied prior art,” citing Ex parte Levy, 17 USPQ2d 1461, 1464 (Bd. Pat. App. & Inter. 1990) (emphasis in original). MPEP § 2112. Further, Applicant has noted in a previous response to an Office Action that the Office Action has not established a *prima facie* case of inherency. Since the Examiner has not subsequently provided a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic necessarily flows

from the teachings of the applied prior art, Applicant respectfully requests that the finality of the current Office Action be removed.

Applicant submits that Bertin taken with Mukai as proposed in the Office Action does not teach or suggest all the elements of the method as recited in claim 1. Thus, Applicant submits that claim 1 is patentable over Bertin taken with Mukai. For at least reasons similar to those stated above with respect to claim 1, Applicant submits that independent claims 8, 9, 13, and 21 are patentable over Bertin taken with Mukai. The claims dependent on claims 1, 8, 9, 13, and 21 are patentable over Bertin taken with Mukai for at least the reasons stated above with respect to claim 1.

Applicant cannot find a teaching or suggestion of a method in the combination of Bertin and Mukai as proposed in the Office Action that includes forming an isolated vertical device region extending outwardly from the substrate where the isolated vertical device region is formed as a region of semiconductor material, forming a body region in the vertical device region, forming a first source/drain region adjacent to the body region, and forming a second source/drain region adjacent to the body region, as recited in claim 14. As noted above with respect to claim 1, Bertin appears to first form a gate and a gate oxide and then fill a void between the gate oxide material with material for a source, drain, and body region, which is clearly a method that is in distinct contrast to the method recited in the instant claim 14. Further, combining Mukai as proposed in the Office Action does not cure the deficiencies in citing Bertin with respect to claim 14.

Thus, Applicant submits that Bertin taken with Mukai as proposed in the Office Action does not teach or suggest all the elements of the method as recited in claim 14. Thus, Applicant submits that claim 14 is patentable over Bertin taken with Mukai. For at least reasons similar to those stated above with respect to claim 14, Applicant submits that independent claim 20 is patentable over Bertin taken with Mukai. The claims dependent on claims 14 and 20 are patentable over Bertin taken with Mukai for at least the reasons stated above with respect to claim 14.

Applicant respectfully requests withdrawal of these rejections of claims 1-30 and 37-38, and reconsideration and allowance of these claims.

**Third §103 Rejection of the Claims**

Claims 31-36 were rejected under 35 USC § 103(a) as being unpatentable over Bertin et al. taken with Mukai as applied to claims 1-30 and further of Mazure et al. Applicant traverses these grounds of rejection of the claims for at least the reasons made of record.

Applicant submits that claims 31-36 are dependent on patentable claims 1, 8, 9, 13, 20 and 21, and, therefore, are patentable.

Applicant respectfully requests withdrawal of these rejections of claims 31-36, and reconsideration and allowance of these claims.

**CONCLUSION**

Applicant respectfully submits that the claims are in condition for allowance and notification to that effect is earnestly requested. The Examiner is invited to telephone Applicant's attorney (612) 371-2157 to facilitate prosecution of this application.

If necessary, please charge any additional fees or credit overpayment to Deposit Account No. 19-0743.

Respectfully submitted,

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Date 11 MARCH 2005

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CERTIFICATE UNDER 37 CFR 1.8: The undersigned hereby certifies that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail, in an envelope addressed to: Mail Stop AF, Commissioner of Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on this 11 day of March, 2005.

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Name

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Signature